

Solving Quadratic Equations without Factoring

Recall: To solve by factoring,

- (1) collect all terms on one side of equal sign
- (2) factor the expression
- (3) use  $(a)(b) = 0$  to state  $a = 0$  or  $b = 0$

Consider this example:

$$x^2 - 12x + 32 = 0$$

$$(x - 8)(x - 4) = 0$$

$$x - 8 = 0$$

$$x = 8$$

$$x - 4 = 0$$

$$x = 4$$

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L8(6.4)-Solving Quadratic Equations without Factoring

Vertex form can also be very useful for solving a quadratic equation.

- Ex.1 (a) Write  $y = x^2 - 12x + 32$  in vertex form  
(b) Solve for  $y = 0$

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In some cases, one may be simpler than the other.

Ex.2 Write in factored & vertex form, then choose which to use for solving.

(a)  $x^2 + 3x - 4 = 0$

(b)  $x^2 - 9 = 7$

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If factoring is not possible use the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

which is derived from completing the square (p.337-338).

Note: To use the quadratic formula, the equation must be in standard form,  $ax^2 + bx + c = 0$ .

The ' $\pm$ ' symbol means there are two solutions.

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{or} \quad x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Apr 1-9:06 AM

Ex.3 Solve using the quadratic formula.

a)  $x^2 - 4x - 3 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

b)  $x^2 - 2x - 5 = 0$

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Assigned Work:

p.343 # 1ad, 3, 4bdf, 5ace, 9ad, 10d, 14, 19\*